New trends in the biocatalytic production of nucleosidic active pharmaceutical ingredients using 2′-deoxyribosyltransferases

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Abstract

Nowadays, pharmaceutical industry demands competitive and eco-friendly processes for active pharmaceutical ingredients (APIs) manufacturing. In this context, enzyme and whole-cell mediated processes offer an efficient, sustainable and cost-effective alternative to the traditional multi-step and environmentally-harmful chemical processes. Particularly, 2′-deoxyribosyltransferases (NDTs) have emerged as a novel synthetic alternative, not only to chemical but also to other enzyme-mediated synthetic processes. This review describes recent findings in the development and scaling up of NDTs as industrial biocatalysts, including the most relevant and recent examples of single enzymatic steps, multienzyme cascades, chemo-enzymatic approaches, and engineered biocatalysts. Finally, to reflect the inventive and innovative steps of NDT-mediated bioprocesses, a detailed analysis of recently granted patents, with specific focus on industrial synthesis of nucleoside-based APIs, is hereunder presented.

Keywords

Biocatalysis; transglycosylation; 2′-deoxyribosyltransferases; nucleoside analogues